What is claimed is:

1. A method for analyzing a semiconductor die having suspect circuitry that includes a multitude of circuit paths, the method comprising:

using a state-changing operation of the suspect circuitry to cause a failure due to the suspect circuitry, identifying one of the circuit paths that electrically changes in response to heat and detecting that a particular circuit portion therein is resistive.

2. A method for analyzing a semiconductor die, the method comprising:

heating at least a selected portion of state-changing circuitry in the semiconductor die to cause a failure due to suspect circuitry, the state-changing circuitry including a suspect signal path site;

detecting, in response to the selected portion being heated, a state-changing transition between a failed mode and a recovered mode in the suspect signal path site; and

using the detected state-changing transition, determining that the signal path site has a resistivity that changes between the failed mode and the recovered mode.

3. The method of claim 2, further comprising electrically operating the die to cause the circuitry to change state in response to at least one of: an input frequency, a controlled voltage supplied to the die and a controlled die temperature.

4. The method of claim 3, further comprising electrically operating the die in a loop that causes the die to fail at a selected failure rate.

5. The method of claim 4, wherein detecting a state-changing transition includes detecting that the failure rate has changed.

6. The method of claim 2, wherein heating at least a selected portion of state-changing circuitry in the semiconductor die includes scanning the die with a laser.

7. The method of claim 6, further comprising:

identifying the portion of the die at which the laser is directed while detecting the state-changing transition, wherein determining that the signal path site has a resistivity that changes includes determining that the signal path site changes when scanned with the laser; and

using the identified portion to determine the location of the resistive signal path site.

8. The method of claim 2, wherein using the detected state-changing transition includes using an image of the operating circuitry and a map of signal paths, further comprising using the image and map to identify the location of the resistive signal path site.

9. The method of claim 1, wherein identifying one of the circuit paths that electrically changes in response to heat includes detecting a change in a failure rate of the circuit path during a state-changing operation.

10. The method of claim 1, further comprising thinning the die prior to the heating.

11. The method of claim 1, wherein heating at least a selected portion of state-changing circuitry includes causing the suspect signal path site to expand.

12. The method of claim 1, further comprising obtaining a cross-sectional image of the suspect signal path site and determining therefrom the portion of the signal path site having a resistivity that changes.

13. The method of claim 1, wherein detecting a state-changing transition between a failed mode and a recovered mode includes detecting that the die is operating improperly.

14. The method of claim 1, further comprising observing a delayed response from the die and determining therefrom that the die includes a resistive defect, prior to the heating.

15. The method of claim 1, further comprising using a scanning optical microscope (SOM).

16. The method of claim 1, further comprising placing the die in a test arrangement adapted to electrically operate the die under selected operating conditions and to obtain a response from the die including the state-changing transition.

17. A method for testing an integrated circuit (IC), the method comprising:

operating the IC in a loop that causes the IC to fail at a selected failure rate;

laser-scanning the IC and detecting a response from the IC, the response including a change in the failure rate of the IC responsive to laser scanning a portion of the IC;

using the detected response as an input control to a contrast amplifier of a display adapted to receive image data including reflected light data from the laser scanning of the IC;

displaying the image data using the contrast amplifier to control the contrast of the image; and

identifying the portion of the IC being scanned that corresponds to the change in failure rate as a portion of the image having a variation in contrast and detecting therefrom that the portion includes a resistive interconnect.

18. A system for analyzing a semiconductor die, the system comprising:

means for heating at least a selected portion of state-changing circuitry in the semiconductor die to cause a failure due to suspect circuitry, the state-changing circuitry including a suspect signal path site;

means for detecting, in response to the selected portion being heated, a state-changing transition between a failed mode and a recovered mode in the suspect signal path site; and

means for using the detected state-changing transition, determining that the signal path site has a resistivity that changes between the failed mode and the recovered mode.

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~~19~~. A system for analyzing a semiconductor die, the system comprising:

a scanning optical microscope (SOM) adapted to direct a laser and heat at least a selected portion of state-changing circuitry in the semiconductor die to cause a failure due to suspect circuitry, the state-changing circuitry including a suspect signal path site;

a detector adapted to detect, in response to the selected portion being heated, a state-changing transition between a failed mode and a recovered mode in the suspect signal path site; and

a display adapted to use the detected state-changing transition and to display an image of the die to be used for determining that the signal path site has a resistivity that changes between the failed mode and the recovered mode.

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~~20~~. The system of claim ~~19~~, wherein the SOM, the detector, and the display are communicatively coupled to each other.

21. The system of claim 20, wherein the display includes an image contrast amplifier, and wherein the detector includes an output adapted to supply a control signal

to the image contrast amplifier in response to the transition between the failed mode and the recovered mode

22. The system of claim 21, wherein the SOM further comprises:

a photodetector adapted to detect reflected light from the die as it is scanned with the laser and to provide a signal representing the detected light to the display; and

a position sensor adapted to provide the position of the laser upon the die.

23. The system of claim 22, wherein the display is adapted to use the signal representing the detected light and the position sensor to display an image of the die, and wherein the contrast of the image of the resistive signal path is altered from that of a non-defective die.